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AUTHOR Eseryel, Deniz; Ganesan, Radha
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ABSTRACT

A typical Web-based training development team consists of a project manager, an instructional designer, a subject-matter expert, a graphic artist, and a Web programmer. The typical scenario involves team members working together in the same setting during the entire design and development process. What happens when the team is distributed, that is when the instructional designers and the developers are not in the same setting? How can a geographically dispersed team work together meaningfully? What are the challenges they will face and how can they be overcome? Because it is becoming more common for instructional technologists to be brought in from several locations long-distance team building presents an important challenge to the process. This paper addresses several issues that instructional designers face when working in such distributed environments based on our experiences during a collaborative project between Syracuse University and a multi-national corporation. Toward this end, we propose using Web-based CSCW (computer supported collaborative work)systems to support distributed group design process. (Contains 17 references.) (Author)

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Distributed Group Design Process: Lessons Learned

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Deniz Eseryel
Syracuse University
Instructional Design, Development, & Evaluation
330 Huntington Hall
Syracuse, NY 13244
deseryel@mailbox.syr.edu

Radha Ganesan
Syracuse University
Instructional Design, Development, & Evaluation
330 Huntington Hall
Syracuse, NY 13244
rganesan@syr.edu

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Abstract: A typical Web-based training development team consists of a project manager, an instructional designer, a subject-matter expert, a graphic artist, and a Web programmer. The typical scenario involves team members working together in the same setting during the entire design and development process. What happens when the team is distributed, that is when the instructional designers and the developers are not in the same setting? How can a geographically dispersed team work together meaningfully? What are the challenges they will face and how can they be overcome? Because it is becoming more common for instructional technologists to be brought in from several locations long-distance team building presents an important challenge to the process. This paper addresses several issues that instructional designers face when working in such distributed environments based on our experiences during a collaborative project between Syracuse University and a multi-national corporation. Toward this end, we propose using Web-based CSCW systems to support distributed group design process.

Introduction

The distributed group instructional design project was the outcome of an initial understanding between a multi-national Corporation and the department of Instructional Design, Development and Evaluation (IDD&E) at Syracuse University. It called for a collaborative engagement between a higher education institution and the industry. The task as set out by the multi-national Corporation was the design of a Web-based instructional product to train its clients on how to read financial reports. Although a print-based product existed, the development of a version effective for web-based delivery was in line with the client's goal of using the World Wide Web (WWW) as an emerging and competitive tool for training. For the purposes of this task, an instructional design team was formed in Syracuse. The development team and the user group were at another location together with the project manager provided by the client.

Since the design and development teams were distributed among several locations, the challenges and issues faced by such a group were vastly different compared to those of a conventional design process of Web-based training (WBT) where the team members are located in the same setting. We quickly realized that two factors were critical to the process: group-model building and computer-support for communication. Besides being interested in the design process we had some specific questions we wanted to explore:

1. How can communication and collaboration be achieved at a distance?
2. What works and does not work for a team working from different geographical locations?
3. How to create an effective, cohesive team when the team is geographically dispersed?
4. What are the best and effective modes of communication using the WWW?

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5. What are the critical processes involved in a distributed instructional design group using a technology-mediated environment?
6. What are the group dynamics that support a distributed design process?

Reflecting on our experiences, this paper discusses a number of important issues concerning work practices, especially communication and cooperation among people, group facilitation and the group-model building process between the instructional design team and the development team. Finally, we propose using Web-based computer supported collaborative work (CSCW) systems as a working environment for distributed group design process. The paper concludes with important elements that such systems should incorporate in their design in order to support and enhance distributed group design process.

Distributed Group Design Process

Group design refers to the design approach in which different stakeholders, such as users, designers, and graphic artists take active part throughout the design process. We adopted Gould and Lewis's (1985) three principles: (i) early focus on typical users and tasks, (ii) empirical measurement that focuses on intended users, and (iii) an iterative design process. In the area of software design and artificial intelligence strong emphasis has been placed on group design (Bannon, 1990; Greenbaum, & Kyng, 1995). Bødker, Grønbœk, and Kyng (1991) also advocate participatory design in the area of software design: "computer applications that are created for the workplace need to be developed with full participation from the users-both from a democratic point of view and to insure that competencies central to design process are represented in the design group" (p.215). However, they point out that users may require help to take on the new role of participant, and designers may need help in their new roles as facilitators: "Full participation requires training and active cooperation...designers should know how to set up the process and need to make sure that everyone gets something out of the interaction" (Bødker, Grønbœk, & Kyng, 1991, p.215-216).

These comments of Bødker et al. highlight an important need for group design that our experiences have also confirmed: group-model building and team facilitation. Our collaborative design process can also be distinguished from similar work with one very important factor: the instructional design team was not in the same location as the development team and user group. Therefore, a very important challenge was that of team building at a distance. Designing training at a distance with a distributed design-development was a unique experience. Besides, neither of us had prior experience with designing training where more than one instructional designer was involved. Since, our experiences with designing WBT also showed a great diversity it was necessary to find a solid base for our efforts.

Group-model building refers to a dynamic model building process in which all the stakeholders are deeply involved in the process of model construction (Vennix, 1999). For instance, the system dynamics community has made considerable progress in developing tools and techniques to support a group-model building process and knowledge elicitation (Morecraft and Sterman, 1994; Richardson & Andersen, 1995; Richardson et al., 1989). Vennix (1996) has connected these efforts of system dynamics model builders to the realms of decision-making, small-group dynamics, and group facilitation. Empirical studies show ultimate gains from group-model building activities in these contexts. Although these domains are different from those of instructional design, the group model building process may likewise enhance instructional planning and analysis. The added advantage is that participants in group planning processes fit well with the notion of participatory design.

Our process can be likened to the reference group approach (Randers, 1977) used by the system dynamics community. Characteristics of a reference group approach are: (a) the product is a process of learning rather than a statement of fact, hence the model becomes a tool to improve discussion; and (b) the group becomes tangible hence providing a continuous interaction between its members. The reference group approach consist of a number of stages (Sternberg, 1980):

1. initiation of study;
2. establishment of reference groups;
3. initial meetings with reference group to define problem;
4. construction of the initial (simple) model based on discussions with the reference group;
5. model improvement through scenario discussions with the reference group;
6. reporting;

7. further discussion.

Our initial group meetings started with a series of audio conferences and e-mail exchanges with the client for the purposes of project planning, and we agreed upon tasks, timeliness, responsibilities, and deliverables. Then, the instructional design team began the process with task analysis, negotiating the conceptual framework and content outlines of web-based training module. Our deliverables included detailed storyboards created on Microsoft Word™ that the developers could then use to create the actual training Web site. A preliminary initial model was made by the instructional design team. Microsoft Word™ was used as the primary software tool for creating the storyboards as a special request from the development team. In order to maintain consistency, a template with the color scheme and the overall layout was developed to help us replicate the user interface. The team members divided the tasks and began to create sections of the product in his/her own student directory.

As the creation of the storyboards progressed, we began to engage in an iterative, nearly simultaneous process of design and revision. The rapid revision process that followed was a direct result of our use of a mediated environment consisting of e-mail messaging and a shared design and common file sharing area on the Web. As one member of the design team designed a piece of the product, other team members would comment on it and provide feedback; making changes, when appropriate. Thus, the team's multiple perspectives resulted in a product that was emergent Records of all e-mail, face-to-face and audio communications were also maintained.

As we came together to work on the project, we agreed on having open communication with each other. This proved as an effective group work leading to improved productivity. The team members worked collaboratively sharing or linking related elements. Our group members each wore many hats. Where skills were lacking, team members with greater expertise coached the others. We followed a collaborative design process by asking questions, requesting technical information, and seeking opinions about dealing with problems. Often, alternative views resulted in major differences of opinion. We acknowledged opposing viewpoints, questioned alternatives, and negotiated differences of opinion. In order to move the design process forward without drifting away, we found that it was important for team members to establish a shared understanding and vision of the final product. Our team organized itself in a way that made the most of individual strengths.

After the design team completed the first prototype, it was sent to the development team and the user group to provide feedback. These efforts were facilitated by the project manager. First tests were conducted on the paper versions before the actual prototype development took place. This iterative process of design and testing took place until all the members were completely satisfied with the overall interface design and the presentation of the content leading to prototype development.

WWW as an Enabling Technology for CSCW Systems

Although our experiences with electronic mail has proved to be successful confirming the past research (Bullen & Bennett, 1990; Grudin, 1991) using a sophisticated, seamless, shared, electronic workspace as described by Ishii, Kobayashi, and Arita (1994) would have proven to be more efficient. Our team members relied heavily on e-mail accounts on different systems and were also using the student accounts on the university's network server. Later on we set up a group account on a web-based shared file storage drive that all the team could access. It facilitated our work affording file sharing and version control. At the beginning of the project, our problem was in gathering and compiling all the materials and information with the necessary tools for design and communication. Our design process was guided by our own input as users, learners, and designers, and was facilitated by the types of communication exchanges that the e-mail system supported. However, we felt a great need to have a Web-based CSCW system that could have made the communication and collaboration more efficient and effective with the other members of the team. Such a system would make organization, communication, and revision of materials easier.

For widely dispersed working groups, where members may be in different organizations and different countries, issues of integration and inter-operability often make it difficult to deploy existing groupware applications. Although non computer-based solutions such as telephone and video conferencing technologies provide some support for collaboration, empirical evidence suggests that computer systems providing access to shared information, at any time and place and using minimal technical infrastructure, are the main requirement of groups collaboration in decentralized working environments (Gorton et al. 1996; Rao, 1995). By offering an extensible centralized

architecture and cross-platform browser implementations, increasingly deployed and integrated with user environments, the Web may provide a means of introducing CSCW systems which offer much richer support for collaboration than e-mail and FTP, and thus serve as an 'enabling technology' for CSCW. Bentley et al. (1997) explain why the Web offers a potential platform for enabling the CSCW technology very well:

- "Web client programs (browsers) are available on all popular computing platforms and operating systems, providing access to information in a platform independent manner,
- browsers offer a simple user interface and consistent information presentation across these platforms, and are themselves extensible through association of external 'helper applications',
- browsers are already part of the computing environment in an increasing number of organizations, requiring no additional installation or maintenance of software for users to cooperate using the Web,
- many organizations have also installed their own Web servers as part of an Internet presence or a corporate Intranet and have familiarity with server maintenance and, in many cases, server extension through programming the server API" (p.3).

As a basis for deployment of CSCW applications in real work domains, the level of acceptance and penetration of Web technology in commercial and academic environments is grounds alone for suggesting that CSCW should pay serious attention to the World Wide Web for supporting distributed group design process.

Conclusion

Given the context, our instructional design process can be characterized by two very distinguished factors: (a) group design, and (b) distributed design teams. Although the team as a whole was primarily interested in the design and development of Web-based training we were also concerned with studying the process and the learning that supported it. We believe such distributed group design projects will soon be a reality in the field of instructional technology.

While the above case presented the distributed group instructional design process, experiences were specific to our own group; we believe our skills as collaborative designers have been enhanced. The strength of the group-model building model for distributed design process is in making designers aware of process that is often covert.

As team members began to develop expertise in the process their initial roles began to evolve. No one member possessed the expertise of the entire group. All team members contribute their expertise and full participation took place. In turn, our individual team building skills and content specific skills were enhanced. The group became a self-organizing system.

We believe that Web-based CSCW has a lot of premise in supporting group design efforts, especially when the group is geographically dispersed. However, in designing such systems, it is important to closely consider the dynamics of collaborative design teams. The system should also allow implementation of group-model building techniques.

We also argue that the field of instructional design should start to address group design. Tennyson (1995), states that ISD has undergone four generations of evolution: first (behavioral-linear model), second (behavioral-cognitive with phases from a systems perspectives), third (primarily cognitive with strong influence from software engineering and cognitive science-waterfall design), fourth (cognitive-constructivist with strong influences from action research and activity theory). The first two generations do not adequately address the collaborative nature of design appropriately. Their focus is more on the processes, i.e., analysis, design, development, and evaluation (Gustafson & Branch, 1997). The third generation models to address the issue, affected by software engineering but the models are to generic and do not focus on the roles of people involved. We found Tennyson's (1995) ISD-4 particularly useful in that focuses on the activities of those involved in designing instruction that the process itself varies greatly depending on context and circumstances.

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